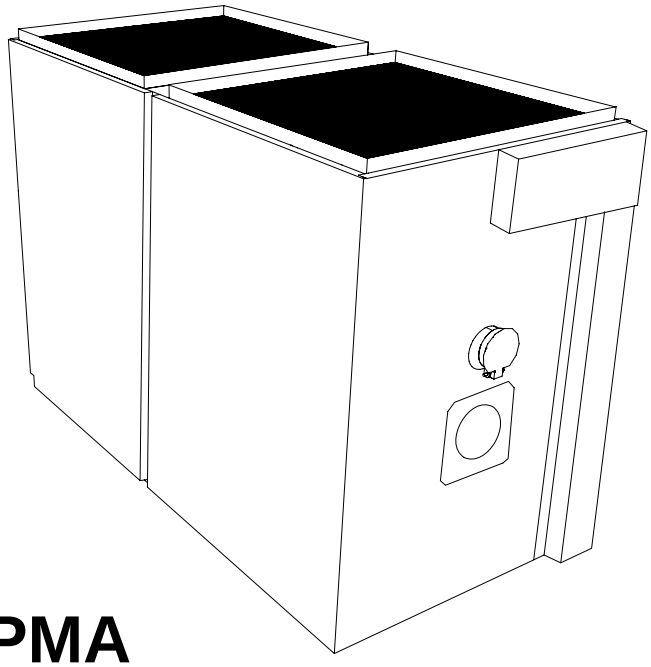
Installation Instructions and Homeowner's Manual

AMT Series

WARM AIR FURNACE
OIL FIRED - UPFLOW



Models:

AMT400B34-SM1PMA
OLR350H28B

Manufactured by:

Dettson Industries Inc

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Sherbrooke, Qc, Canada, J1L 1V8

www.dettson.ca

Attention
Do not tamper with the unit or its controls. Call a qualified service technician.

INSTALLER / SERVICE TECHNICIAN :

Use the information in this manual for the installation / servicing of the furnace and keep the document near the unit for future reference.

HOMEOWNER :

Please keep this manual near the furnace for future reference.

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1 SAFETY REGULATIONS

1.1 SAFETY LABELING AND WARNING SIGNS

The words DANGER, WARNING AND CAUTION are used to identify the levels of seriousness of certain hazards. It is important that you understand their meaning. You will notice these words in the manual as follows:

DANGER

Immediate hazards that WILL result in death, serious bodily injury and/or property damage.

WARNING

Hazards or unsafe practices that CAN result in death, bodily injury and/or property damage.

CAUTION

Hazards or unsafe practices that CAN result in bodily injury and/or property damage.

1.2 IMPORTANT INFORMATION

WARNING

Non-observance of the safety regulations outlined in this manual will potentially lead to consequences resulting in death, serious bodily injury and/or property damage.

a) It is the homeowner's responsibility to engage a qualified technician for the installation and subsequent servicing of this furnace;
b) Do not use this furnace if any part of it was under water. Call a qualified service technician immediately to assess the damage and to replace all critical parts that were in contact with water;
c) Do not store gasoline or any other flammable substances, such as paper, carton, etc. near the furnace;
d) This furnace is designed for use with #1 or #2 heating oil only. The use of gasoline, motor oil or any other oil containing gasoline is prohibited;
e) Never block or otherwise obstruct the filter and/or return air openings;
f) Ask the technician installing your furnace to show and explain to you the following items:
  i) The main disconnect switch;
  ii) The shut-off valve on the oil tank;
  iii) The oil filter and how to change it (once a year);
  iv) The air filter and how to change it (check monthly and clean or replace if necessary.)
g) Before calling for service, be sure to have the information page of your manual close by in order to be able to provide the contractor with the required information, such as the model and serial numbers of the furnace.

WARNING

Installations and repairs performed by unqualified persons can result in hazards to them and to others. Installations must conform to local codes or, in the absence of same, to codes of the country having jurisdiction.

The information contained in this manual is intended for use by a qualified technician, familiar with safety procedures and who is equipped with the proper tools and test instruments.

Failure to carefully read and follow all instructions in this manual can result in death, bodily injury and/or property damage.

1.3 DETECTION SYSTEMS

It is recommended that carbon monoxide detectors be installed wherever oil or gas fired heaters are used. Carbon monoxide can cause bodily harm or death. For this reason, agency approved carbon monoxide detectors should be installed in your residence and properly maintained to warn of dangerously high carbon monoxide levels.

There are several sources of possible smoke and flames in a residence. Smoke and flames can cause bodily harm or death. For this reason, agency approved smoke detectors should be installed in your residence and properly maintained, to warn early on, of a potentially dangerous fire. Also, the house should be equipped with approved and properly maintained fire extinguishers.

Your unit is equipped with safety devices that can prevent it from functioning when anomalies are detected such as a blocked venting system.

1.4 DANGER OF FREEZING

CAUTION

If your furnace is shut down during the cold weather season, water pipes may freeze, burst and cause serious water damage. Turn off the water supply and bleed the pipes.

If the heater is left unattended during the cold weather season, take the following precautions:

a. Close the main water valve in the house and purge the pipes if possible. Open all the faucets in the house;
b. Ask someone to frequently check the house during the cold weather season to make sure that there is sufficient heat to prevent the pipes from freezing. Tell this person to call an emergency number if required.

2 INSTALLATION

The unit is shipped with a burner and its controls. It requires a 115VAC power supply to the control panel and thermostat hook-up as shown on the wiring diagram, one or more oil line connections, suitable ductwork and connection to a properly sized vent.

All local and national code requirements governing the installation of oil burning equipment, wiring and the flue connection MUST be followed. Some of the codes that may apply are:

CSA B139: Installation code for oil burning equipment.

ANSI/NFPA 31: Installation of oil burning equipment.

ANSI/NFPA 90B: Warm air heating and air conditioning systems.

ANSI/NFPA 211: Chimneys, Fireplaces, Vents and solid fuel burning appliances.

ANSI/NFPA 70: National Electrical Code.

CSA C22.1 or CSA C22.10: Canadian Electrical Code.

Only the latest issues of these codes may be used.

2.1 POSITIONING THE FURNACE

WARNING

Fire and explosion hazard.

The furnace must be installed in a level position, never where it will slope toward the front.

Do not store or use gasoline or any other flammable substances near the furnace.

Non-observance of these instructions will potentially result in death, bodily injury and/or property damage.

CAUTION

This furnace is not watertight and is not designed for outdoor installation. It must be installed in such a manner as to protect its electrical components from water. Outdoor installation will lead to a hazardous electrical condition and to premature failure of the equipment.

The minimum clearances from combustible material for each of the positions are specified in Table 4.

If the furnace is installed in a basement or on a dirt floor, in a crawl space for example, it is recommended to install the unit on a cement base 2.5 cm to 5.0 cm (1" to 2") thick.

The unit must be installed in an area where the ambient and return air temperatures are above 15°C (60°F). In addition, the furnace should be installed as closely as possible to the vent, so that the connections are direct and kept to a minimum. The heater should also be located close to the centre of the air distribution system.

2.2 ELECTRICAL SYSTEM

CAUTION

The exterior of the unit must have an uninterrupted ground to minimize the risk of bodily harm, if ever an electrical problem develops. A green ground screw is supplied with the control box for that purpose.

The appliance must be installed in accordance with the current ANSI/NFPA 70 National Electrical Code, CSA C22.1 Canadian Electrical Code Part 1 and/or local codes.

The control system depends on the correct polarity of the power supply. Connect “HOT” wire (H) and “NEUTRAL” wire (N) as shown in Figures 3 and 4, p. 17 and 18.

A separate line voltage supply should be used, with fused disconnect switch or circuit breaker, between the main power panel and the unit.

Only copper wire may be used for the 115V circuit on this unit. If wires need to be changed, the replacements must have the same temperature resistance as the originals.

2.3 INSTALLATION OF THE BURNER

Also refer to the burner manufacturer’s instructions.

1. Position the mounting gasket between the mounting flange and the burner mounting plate. Align the holes in the burner mounting plate with the studs on the mounting flange and bolt securely in place.
2. Remove the burner drawer assembly or the air tube assembly;
3. Install the nozzle (refer to Technical Specifications, p.13);
4. Check the electrode settings;
5. Make the electrical connections;
6. Complete oil line connections.

2.3.1 NOZZLES

The burner comes equipped with an appropriate nozzle. However, if another size or a replacement nozzle is required, use the manufacturer’s recommended spray angle and type a shown in Table 1 and based on a pump pressure of 100 psi.

Always select nozzle sizes by working back from the desired flow rate at operating pressure and not the nozzle marking.

2.3.2 AIR AND TURBULATOR SETTINGS

Before starting the burner for the first time, adjust the air and turbulator settings to those listed in this manual. Once the burner becomes operational, final adjustments will be required. Refer to section 3 of this manual.

2.4 VENTING

WARNING

Poisonous carbon monoxide gas hazard.

Never install a hand operated damper in the vent pipe. However, any Underwriters Laboratories listed, electrically operated automatic type vent damper may be installed if desired. Be sure to follow the instructions provided with vent damper. Also, read and follow all instructions in this section of the manual.

Failure to properly vent this furnace or other appliances can result in death, bodily injury and/or property damage.

To ensure the safe and proper functioning of an oil furnace, it must always be connected to a flue with sufficient draft or to an approved side-wall venting system. In addition, it is strongly recommended to perform a complete inspection of all the existing venting systems.

2.4.1 MASONRY CHIMNEY

This furnace can be vented into an existing masonry chimney. However, the unit must not be vented into a chimney into which a solid fuel burning furnace is already being vented.

Before venting this furnace into a chimney, its condition must be checked and repairs made, if necessary. Also, the chimney lining and dimensions must conform to local and national codes.

2.4.2 FACTORY BUILT CHIMNEYS

Oil fired furnaces are approved for use with "L" type vents. The unit may also be used with an approved chimney of proper dimensions and temperature ratings as specified in the installation code. Refer to chimney manufacturer's instructions for proper installation.

2.4.3 DRAFT REGULATOR

This unit may be installed with or without a draft regulator. However, it is recommended that a draft regulator be installed in cases where the draft is either high or variable due to external conditions. Follow the instructions provided with the regulator.

2.5 BLOCKED VENT SHUT-OFF DEVICE (BVSO) FOR CHIMNEY VENTING

CAUTION

It is imperative that this device be installed by a qualified service technician.

A positive pressure venting system (Sealed Combustion System or Direct Vent) **MUST NOT** use the BVSO. Follow the instructions supplied with the venting system.

This device is designed to detect the insufficient evacuation of combustion gases in the event of a vent blockage. In such a case the thermal switch will shut down the oil burner. The device will then need to be re-armed MANUALLY.

Refer to the detailed instructions and wiring diagrams supplied with the BVSO for the installation and wiring procedures. The length of wires supplied with the unit is such that the safety device must be installed between the flue outlet of the appliance and the draft regulator, as indicated in the instructions.

It is also essential that the BVSO be maintained annually. For more details refer to the instructions supplied with the device itself, as well as Section 3 of this Manual.

2.5.1 BVSO PERFORMANCE TEST

The purpose of the following test is to check that the electrical outlet on the furnace, designated to the BVSO, is functional.

1. Start up the burner;
2. Remove the three-pole plug from the BVSO outlet on the furnace;
3. The burner must shut-off immediately, while the blower continues to run to the end of the cool-down cycle.

If the test is not in line with the above, call a QUALIFIED SERVICE TECHNICIAN.

2.6 COMBUSTION AIR SUPPLY AND VENTILATION

WARNING

Poisonous carbon monoxide gas hazard.

Comply with NFPA 31 (U.S.) and CSA B139 (Canada) standards for the installation of Oil Burning Equipment and applicable provisions of local building codes to provide combustion and ventilation air.

Failure to provide adequate combustion and ventilation air can result in death, bodily injury and/or property damage.

Oil furnaces must have an adequate supply of combustion air. It is common practice to assume that older homes have sufficient infiltration to accommodate the combustion air requirement for the furnace. However, home improvements such as new windows, doors, and weather stripping have drastically reduced the volume of air infiltration into the home.

Refer to oil furnace installation codes relative to combustion and ventilation air requirements. Consult Section 2.1 in this manual, specifically for units installed in an enclosed space.

Home air exhausters are common. Bathroom and kitchen fans, power vented clothes dryers and water heaters all tend to create a negative pressure condition in the home. Should this occur the chimney becomes less and less effective and can easily downdraft. In certain cases, mechanically supplied air, by way of a blower, interlocked with the unit, is necessary. It is the installer's responsibility to check that.

2.6.1 CONTAMINATED COMBUSTION AIR

Installations in certain areas or types of structures will increase the exposure to chemicals or halogens that may harm the furnace. These conditions will require that only outside air be used for combustion.

The following areas or types of structures may contain or be exposed to certain substances, potentially requiring outside air for combustion:

a. Commercial buildings;
b. Buildings with indoor pools;
c. Furnaces installed near chemical storage areas.

Exposure to the following substances:

a. Permanent wave chemicals for hair;
b. Chlorinated waxes and cleaners;
c. Chlorine based swimming pool chemicals;
d. Water softening chemicals;
e. De-icing salts or chemicals;
f. Carbon tetrachloride;
g. Halogen type refrigerants;
h. Cleaning solvents (such as perchloroethylene);
i. Printing inks, paint removers, varnishes, etc. ;
j. Hydrochloric acid;
k. Solvent based glue;
l. Antistatic fabric softeners for clothes dryers;
m. Acid based masonry cleaning materials.

2.6.2 BURNER WITH OUTDOOR COMBUSTION AIR KIT

Certain burners are designed to function with combustion air taken directly from the outside. Follow the instructions provided with the burner, the fresh-air supply kit or the side-wall venting kit.

2.7 OIL TANK

WARNING

Fire and explosion hazard.

Use only approved heating type oil in this furnace. DO NOT USE waste oil, used motor oil, gasoline or kerosene.

Use of these will result in death, bodily injury and/or property damage.

Check your local codes for the installation of the oil tank and accessories.

At the beginning of each heating season or once a year, check the complete oil distribution system for leaks.

Ensure that the tank is full of clean oil. Use No.1 or No.2 Heating Oil (ASTM D396 U.S.) or in Canada, use No.1 or No.2 Furnace Oil.

A manual shut-off valve and an oil filter shall be installed in sequence from tank to burner. Be sure that the oil line is clean before connecting to the burner. The oil line should be protected to eliminate any possible damage. Installations where the oil tank is below the burner level must employ a two-pipe fuel supply system with an appropriate fuel pump. A rise of 2.4 m (8') and more requires a two stage pump and a rise greater than 4.9 m (16') an auxiliary pump. Follow the pump instructions to determine the size of pipe needed in relation to the rise or to the horizontal distance.

2.8 DUCTING

WARNING

Poisonous carbon monoxide gas hazard.

DO NOT draw return air from inside a closet or utility room. Return air MUST be sealed to the furnace casing.

Failure to properly seal ducts can result in death, bodily injury and/or property damage.

The ducting must be designed and installed according to approved methods, local and national codes as well as good trade practices.

When ducting supplies air to a space other than where the furnace is located, the return air must be sealed and also be directed to the space other than where the furnace is located.

2.8.1 AIR FILTER

A properly sized air filter must be installed on the return air side of the unit. Refer to the Technical Specifications, p.15, for the correct dimensions. Also refer to Section 2.3 and the instructions supplied with the filter.

2.9 INSTALLATION OF ACCESSORIES

WARNING

Electrical shock hazard.

Turn OFF electrical power at the fuse box or service panel before making any electrical connections and ensure a proper ground connection is made before connecting line voltage.

Failure to do so can result in death or bodily injury.

2.9.1 AIR CONDITIONER (OR HEAT PUMP)

An air conditioning coil may be installed on the supply air side ONLY.

WARNING

Poisonous carbon monoxide gas hazard.

Install the evaporator coil on the supply side of the furnace ducting ONLY.

An evaporator coil installed on the return air side of the ducting can cause condensation to form inside the heat exchanger, resulting in heat exchanger failure. This in turn, can result in death, bodily injury and/or property damage.

A clearance of 15 cm (6") is required between the bottom of the coil drain pan and the top of the heat exchanger. If a heat pump is installed, a “dual-energy” thermostat, or other control is recommended, in order to prevent the simultaneous operation of the furnace and the heat pump. It also prevents a direct transition from heating by way of the heat pump to heating with oil. Refer to the thermostat instructions or those of another control used for the proper wiring.

If a coil blower compartment is used, install air tight, motorized and automatic air dampers. Cold air coming from the coil and passing across the furnace can cause condensation and shorten the life of the heat exchanger.

3 OPERATION

3.1 START-UP

Before starting up the unit, be sure to check that the following items are in compliance:

1. The electrical installation, the oil supply system, the venting system, combustion air supply and ventilation;
2. The blower access door is in place and the blower rail locking screws are well tightened;
3. The Blocked Vent Shut-Off (BVSO) is installed according to instructions (for chimney venting);
4. The oil supply valve is open;
5. The burner ‘’Reset’’ button is well pushed in or re-armed;
6. The preliminary air adjustments on the burner comply with the technical specifications in this manual;
7. The blower speed adjustments for heating and air conditioning are appropriate and according to the specifications in this manual;
8. The blower start/stop delays are satisfactory;
9. The thermostat of the room is in the heating mode and is set higher than the ambient temperature.

To start the unit, turn the main electrical switch on.

3.2 SEQUENCE OF OPERATION BECKETT AFG / RIELLO 40-F

1. **Normally open contact (T-T) on primary relay closed when thermostat calls for heat;**
2. **Beckett burner: The motor starts and spark is established. The pump pressure builds and the oil supply mechanism opens, admitting fuel to the nozzle;**

   Riello burner: Burner motor starts. The burner motor fan pre-purges the combustion chamber and vent for 10 seconds, establishing the combustion air pattern. During this time the solenoid valve holding coil pressure is approximately 100 psig. The solenoid valve opens, allowing oil to flow through the nozzle. At the same time, the burner motor ignition coil produces a spark;
3. **Spark ignites oil droplets;**
4. **Cad cell senses flame and burner continues to fire. Ignition transformer ceases sparking (Riello R40-F);**
5. **After fan-limit control heats up to the factory set point, the circulating air blower and electronic air cleaner starts;**
6. **The circulating air blower and burner motor remain on until the thermostat is satisfied (AFG). The ignition transformer continues to spark (AFG). The solenoid valve remains open (R40-F);**

Thermostat is satisfied :

7. **Primary relay contacts open, solenoid valve closes (R40-F), burner fan motor shuts down. The ignition transformer ceases sparking (AFG);**
8. **The fan-limit control bi-metal cools down to the factory set point of 90^{o} F (32^{o} C). At that point the circulating air blower stops.**

3.3 CHECKS AND ADJUSTMENTS

3.3.1 PURGING THE OIL LINE

Open the bleed port screw and start the burner. Allow the oil to drain into a container for at least 10 seconds. The oil should flow absolutely free of white streaks or air bubbles to indicate that no air is being drawn into the suction side of the oil piping and pump. Slowly close and tighten the bleed screw. Once closed, the flame will light up.

3.3.2 PRESSURE ADJUSTMENT

The oil pressure must be adjusted according to the Technical Specifications of this manual. An adjustment screw and a connection for a pressure gauge are located on the oil pump for that purpose. Also refer to the burner instruction manual.

3.3.3 COMBUSTION CHECK

IMPORTANT

The heat exchanger metal surfaces may have oil and the baffle insulation also contains binders. These products will burn or evaporate when the unit operates for the first time. Because of that, the smoke reading may be skewed during the first minutes of operation. Therefore, the unit must operate during at least 60 minutes before taking any readings to adjust the combustion quality. Let the unit cool down before making any adjustments.

IMPORTANT

The combustion check verification MUST be performed after the nozzle replacement or the burner cleaning. After these manipulations, the combustion parameters are necessarily modified. Refer also to the burner instruction manual.

1. Pierce a test hole in the flue pipe, approximately 18 inches from the furnace breech. Insert the smoke test probe into the hole. For installation using a sidewall venting, use the orifice provided on the breech plate;
2. From a cold start, let the unit operate for about 5 minutes;
3. Set the burner air setting until you have between 0 and 1 on the Bacharach Scale (or a ''trace'');
4. Take a CO_2 sample at the same test location where the ''trace'' of smoke reading was taken and make note of it. Example: 13.8% of CO_2 or 2.5% of O_2;
5. Adjust the burner air setting to obtain a CO_2 reading 1.5% lower (or a O_2 reading 2.0% higher) than the reading associated with the ''trace'' of smoke. Example: 12.3% of CO_2 or 4.5% of O_2;
6. This method of adjusting the burner will result in clean combustion (Bacharach smoke scale between 0 and a trace) and ensure the proper functioning of the system. The optimum CO_2 level is around 12% to 13% (or 3.5% to 5.0% of O_2).

3.3.4 DRAFT REGULATOR ADJUSTMENT

On chimney installations only, a barometric draft regulator (supplied with the furnace) must be installed, in order to ensure proper draft through the furnace. The barometric damper must be mounted with the hinge pins in a horizontal position and the face of the damper vertical for proper functioning (see instructions included with the damper.) After the furnace has been firing for at least five minutes, the draft regulator should be set to between -0.025" and -0.060" W.C.

3.3.5 OVERFIRE PRESSURE TEST

The overfire draft that is taken through the observation port, located above the burner, is a measurement necessary to determine if there is a blockage in the heat exchanger or the flue pipe. Refer to the Technical Specifications in this manual for overfire pressure values. A high pressure condition may be caused by excessive combustion air, due to the air band being too wide open, or a lack of flue draft (chimney effect) or some other blockage, such as soot in the secondary section of the heat exchanger or the use of an oversize nozzle input or high pressure pump.

3.3.6 VENT TEMPERATURE TEST

1. After having adjusted the burner combustion, insert a thermometer into the test hole in the breech pipe;
2. The total vent temperature should be between 204 and 302°C (400 and 575°F). If not, check for improper air temperature rise, pump pressure, nozzle size or a badly sooted heat exchanger. Also refer to section 2.5 for proper flue pipe sizing.

CAUTION

Low flue gas temperature increases the risk of condensation. Adjust the total flue gas temperature at or higher then 204°C (400°F) in order for the heat exchanger warranty to remain in force.

3.3.7 BLOWER MOTOR TEST

Air adjustment

The units are factory mounted with a variable diameter pulley on the motor and with a fixed diameter pulley on the blower. To obtain the air temperature rise specified in the technical specification table, the variable pulley must be adjusted. Refer to Table 3 and 4 for the number of turns to be applied on the variable pulley.

⚠ WARNING

Personal injury or electric shock hazard.

Turn off electric power at fuse box or service panel before the blower adjustment. Failure to do so can result in bodily injury and/or death.

Table 1- Blower adjustment

	AMT-245 /280	AMT-315 /350
Approximate airflow (CFM)	**3100**	**3500**
Motor pulley adjustment (Number of turns)	**3.5**	**3**

- With 0.25" W.C. static pressure

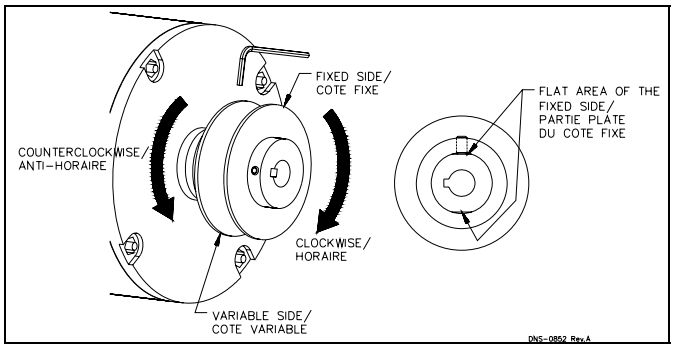
Table 2 – Pulley adjustment

	AMT-245 /280	AMT-315 /350
Approximate airflow (CFM)	**2780**	**3400**
Motor pulley adjustment (Number of turns)	**2**	**1**

- With 0.50" W.C. static pressure

To decrease the airflow, loosen setscrew on the inner half of the motor pulley, looking at the shaft end. Turn the inner half of the pulley clockwise. After the adjustment, the setscrew must be tightened on the flat side of the motor shaft. Be sure that the blower belt tension is adequate. (Refer to the maintenance section).

Figure 1 – Pulley adjustment



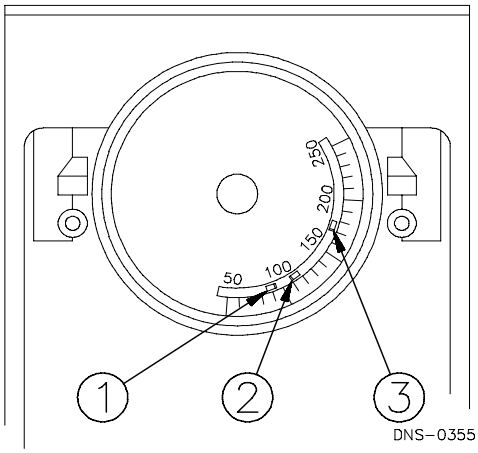
3.3.8 FAN LIMIT ADJUSTMENT

Modification of the "FAN ON" and "HI" limit settings on the Fan-Limit can cause malfunctioning of the furnace and result in premature wear of the heat exchanger.

CAUTION

Modification of the factory set limits will void the warranty.

Figure 2 – High limit adjustment



AMT4 , OLR350H28A		
1	**"FAN OFF" Limit**	32°C (90°F)
2	**"FAN ON" Limit**	43°C (110°F)
3	**"HI" Limit**	93°C (200°F)

3.3.9 SUPPLY AIR TEMPERATURE RISE TEST

1. Operate the burner for at least 10 minutes;
2. Measure the air temperature in the return air plenum;
3. Measuring the air temperature in the largest trunk coming off the supply air plenum, just outside the range of radiant heat from the heat exchanger. 0.3 m (12") from the plenum of the main take-off is usually sufficient;
4. The temperature rise is calculated by subtracting the return air temperature from the supply air temperature;
5. If the temperature rise is lower or exceeds the temperature specified in Table 1, p. 13, change to the next lower or higher blower speed tap, until the temperature rise falls to the target. If the excessive temperature rise cannot be increased or reduced by changing fan speed, investigate for ductwork obstructions, dirty or improper air filter, improper firing caused by improper pump pressure or nozzle sizing.

3.3.10 LIMIT CONTROL CHECK

After operating the furnace for at least 15 minutes, restrict the return air supply by blocking the filters or the return air register and allow the furnace to shut off on High Limit. The burner will shut off but the blower will continue to run.

Remove the obstruction and the burner should restart after a few minutes. The time required for the restart also depends on the adjustment of the blower "OFF" delay.

3.3.11 RESTART AFTER BURNER FAILURE

1. Set the thermostat lower than room temperature;
2. Press the reset button on the burner primary control (relay);
3. Set the thermostat higher than room temperature;
4. If the burner motor does not start or ignition fails, turn off the disconnect switch and CALL A QUALIFIED SERVICE TECHNICIAN.

CAUTION

Do not attempt to start the burner when excess oil has accumulated, when the furnace is full of vapour or when the combustion chamber is hot.

4 MAINTENANCE

WARNING

Electrical shock hazard.

Turn OFF power and fuel to the furnace before any disassembly or servicing.

Failure to do so can result in death, bodily injury and/or property damage.

Preventive maintenance is the best way to avoid unnecessary expense and inconvenience. Have your heating system and burner inspected by a qualified service technician at regular intervals.

To maintain the reliability and optimal performance of the furnace, have a complete combustion check done after the annual maintenance call. Do not attempt to repair the furnace or its controls. Call a qualified service technician.

Before calling for repair service check the following points:

1. Check the oil tank gauge and make sure that the valve is open;
2. Check fuses and the circuit breaker;
3. Check if the main disconnect switch is ON ;
4. Set the thermostat above room temperature;
5. If ignition does not occur, turn off the disconnect switch and call a qualified service technician.

When ordering replacement parts, please specify the complete furnace model number and serial number.

4.1 CLEANING THE HEAT EXCHANGER

It is not generally necessary to clean the heat exchanger or flue pipe every year, but it is advisable to have the oil burner service technician check the unit before each heating season to determine whether the cleaning or replacement of parts is necessary.

If a cleaning is necessary, the following steps should be performed:

1. Turn OFF all utilities upstream from the furnace;
2. Disconnect the flue pipe;
3. Remove the flue collar panel located at the rear of the furnace;
4. Remove the clean-out door located at the front of the furnace;
5. Remove the heat exchanger baffles;
6. Disconnect the oil line and remove the oil burner;
7. Clean the secondary tubes and the primary cylinder with a stiff brush and a vacuum cleaner;
8. Before re-assembling the unit, the heat exchanger and combustion chamber should be inspected to determine if replacement is required;
9. After the cleaning replace the heat exchanger baffles, flue collar plate and oil burner;
10. Readjust the burner for proper operation.

4.2 CLEANING THE BLOCKED VENT SHUT-OFF DEVICE (BVSO)

For continuous safe operation, the Blocked Vent Shut-off device (BVSO) must be inspected and maintained annually by a qualified service technician.

1. **Disconnect power to the appliance;**
2. Remove the two screws holding on the BVSO assembly cover;
3. Remove the cover;
4. Remove the two screws holding the control box to the heat transfer tube assembly. Sliding the control box in the appropriate direction will unlock it from the heat transfer tube assembly;
5. Carefully remove any build-up from the thermal switch surface;

CAUTION

Do not dent or scratch the surface of the thermal switch. If the thermal switch is damaged it MUST be replaced.

6. Clean and remove any build-up or obstruction inside the heat transfer tube;
7. Re-mount, lock and fasten the control box with the 2 screws removed in step 4;
8. Re-attach the assembly cover with the screws removed in step 2;
9. Re-establish power to the unit.

4.3 CLEANING OF THE BURNER HEAD

Once annually, remove the retention head and electrodes from the drawer assembly and remove all foreign matter, if necessary. Also clean the extremity of the burner tube, if necessary.

4.4 REPLACING THE NOZZLE

Replace the nozzle once a year with the one specified in Table 1, p. 14.

4.5 REPLACING THE OIL FILTER

Tank Filter

The tank filter should be replaced as required. Follow the manufacturer's instructions.

Secondary Filter

The 10 micron, or finer, filter cartridge should be replaced annually. Follow the manufacturer's instructions.

4.6 REPLACING THE AIR FILTER

Dirty filters have an impact on the efficiency of the furnace and increase fuel consumption.

Air filters should be replaced at least once a year. Very dusty conditions, the presence of animal hair and the like will require more frequent changing or cleaning.

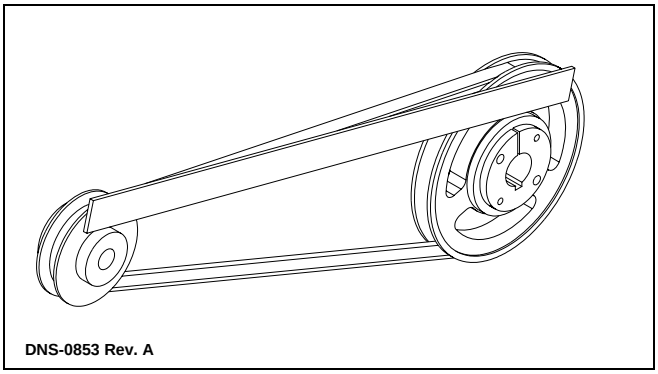
4.7 MOTOR LUBRICATION

Do NOT lubricate the oil burner motor or the direct drive blower motor as they are permanently lubricated.

4.8 PULLEY ALIGNMENT

Align the motor pulley and the blower pulley by moving the motor on the blower rail. Set a straightedge on the two pulleys and check if the blower belt is perfectly parallel to it (refer to Figure 4).

Figure 3 – Pulley adjustment



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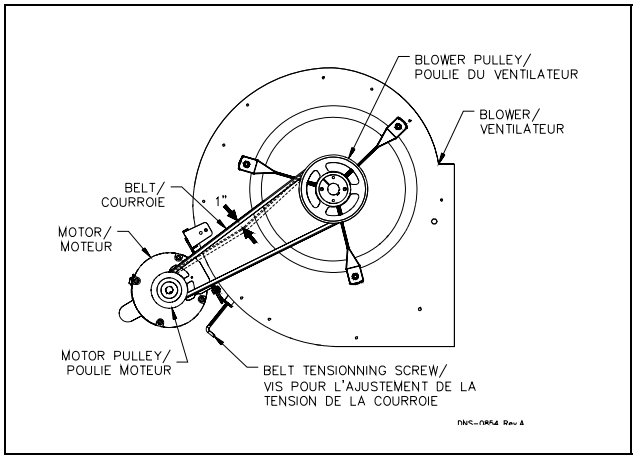
4.9 BELT REPLACEMENT

Check the blower belt for wear and replace if necessary, using the two adjustment screws located near the motor base. ALWAYS remove the belt tension before replacing it. NEVER use a screwdriver to remove or install a belt. This can damage the pulleys and other components.

Belt tension verification

Ideally, belt tension should be checked with an appropriate gauge. If such a tool is not available, the tension can be checked by applying pressure to it in the centre between the pulleys. The belt displacement should be about 25.4 mm (1") (refer to Figure 4.1). Adjust the belt by using the two adjustment screws located near the motor base.

Figure 4 – Belt tension verification



CAUTION
Excessive belt tension is the most frequent cause of bearing wear and resulting noise. Check for proper belt adjustment.

5 FURNACE INFORMATION

Model: _____ Serial number: _____

Furnace installation date: _____

Service telephone #-Day: _____ Night: _____

Dealer name and address: _____

_____

_____

START-UP RESULTS

Nozzle: _____ Pressure: _____ lb/po^2

Burner adjustments: Primary air _____

Fine air _____

Drawer Assembly _____

CO_2 : _____ % Smoke scale: _____ (Bacharach)

Gross stack temperature: _____ °F

Ambient temperature: _____ °F

Chimney draft : _____ " W.C.

Overfire draft : _____ " W.C.

Test performed by: _____

Table 3: Technical Specifications

RATING AND PERFORMANCE				
Firing rate (USGPH)	1.75	2.00	2.25	2.50
Input (BTU/h)	245 000	280 000	315 000	350 000
Heating capacity (BTU/h)	215 300	241 600	270 900	297 000
Maximum heating temperature rise	18 - 29°C (65 - 85°F)			
BECKETT BURNER (3450 RPM)	**AFG-F12**	**AFG-F22**		
	TUBE INSERTION 2 7/8"			
Low firing rate baffle	NOT APPLICABLE			
Static disc, model	NOT APPLICABLE			
Nozzle (Delavan)	1.50-70W	1.75-70B	2.00-70B	2.25-70B
Pump pressure (PSIG)	135	135	155	125
Combustion air adjustment (band / shutter)	2 / 4	2 / 5.5	3 / 3.5	4 / 4
RIELLO BURNER; MODEL F-40	**F10 (TUBE INSERTION 3 9/16")**			
Nozzle (Delavan)	1.50-70W	1.75-60B	2.00-60B	2.25-60B
Pump pressure (PSIG)	135	135	155	125
Combustion air ajustment (turbulator / damper)	2 / 2.4	2 / 3.2	2 / 3.8	4 / 3.6
ELECTRICAL SYSTEM				
Volts - Hertz - Phase (Blower)	230 - 60 - 1			
Volts - Hertz - Phase (Burner)	115 - 60 - 1			
Operating voltage range	14.6			
Minimum ampacity for wiring sizing	17.4			
Max. fuse size (Amps)	20.0			
BLOWER DATA				
Blower size	GT15-12			
Motor	1.5 HP			
Motor pulley adj. at 0.25" W.C. static pressure (turns)	3.5	3.5	3	3
Motor pulley adj. at 0.50" W.C. static pressure (turns)	2	2	1	1
GENERAL DATA				
Overall W x L x H less burner	26" x 66 7/8" x 46 7/8"			
Shipping weight	181 kg (400 lbs)			
Filter quantity and size	(2) 20" x 30"			
Supply air duct W x L	23 7/8" x 25 7/8" ou 23 7/8" x 29 3/4"			
Return air duct W x L	23 7/8" x 25 3/4"			
Maximum cooling capacity	8 tons			

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Table 4: Air Delivery - CFM with Air Filter

MODEL	**INPUT (USGPH)**	**CFM EXTERNAL STATIC PRESSURE**	
		0.25"	**0.50"**
AMT400B34-SM1PM / OLR350H28A	**1.75**	3 100	2 780
	2.00	3 100	2 780
	2.25	3 500	3 400
	2.50	3 500	3 400

Table 5 - Minimum clearances – combustible materials - CANADA

LOCATION	APPLICATION	CLEARANCE (combustible materials)	RECOMMENDED ACCESS FOR SERVICE
Sides	**Left or right**	**0.6 m (24")** *	
	Left or right	**0.25 mm (9")**	
Back	**Access panel to blower**	**0.6 m (24")** *	**0.9 m (36")**
Top	**Furnace or plenum**	**0.15 m (6")** *	
	Horizontal warm air duct within 1.8 m (6') of furnace	**0.15 m (6")** *	
Bottom	**Furnace (combustible floor)**	**0"**	
Flue pipe	**Horizontally or below flue pipe**	**0.25 mm (9")**	
	Vertically above flue pipe	**0.25 mm (9")**	
Front	**From burner**	**0.6 m (24")** *	

*Refer to the applicable installation code if a clearance reduction is required (ex: CSA B139 in Canada)

Table 6 - Minimum clearances – combustible materials -USA

LOCATION	APPLICATION	CLEARANCE (combustible materials)	RECOMMANDED ACCESS FOR SERVICE
Sides	**Left or right**	**0.15 m (6")**	
Back	**Access panel to blower**	**0.15 m (6")**	**0.9 m (36")**
Top	**Furnace or plenum**	**50.8 mm (2")**	
Bottom	**Furnace (combustible floor)**	**0"**	
Flue pipe	**All around**	**0.5 m (18")**	
Front	**From burner**	**0.6 m (24")**	

*Refer to the applicable installation code if a clearance reduction is required (ex: NFPA 31 in the USA)

Figure 5 - Furnace dimensions

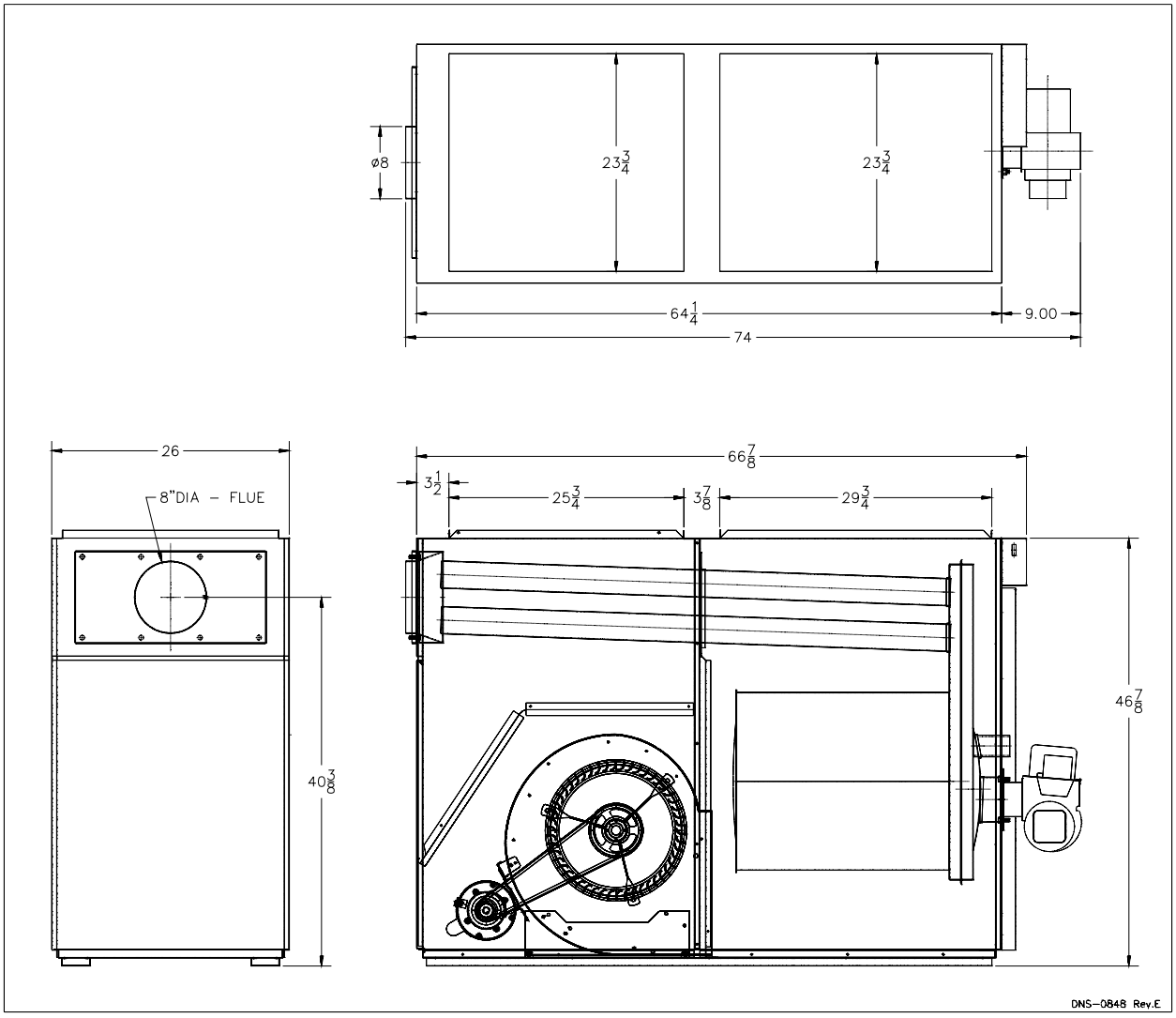

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Figure 6 - Ladder Diagram, Heating and Cooling
AMT400B34-SM1PMA / OLR350H28B

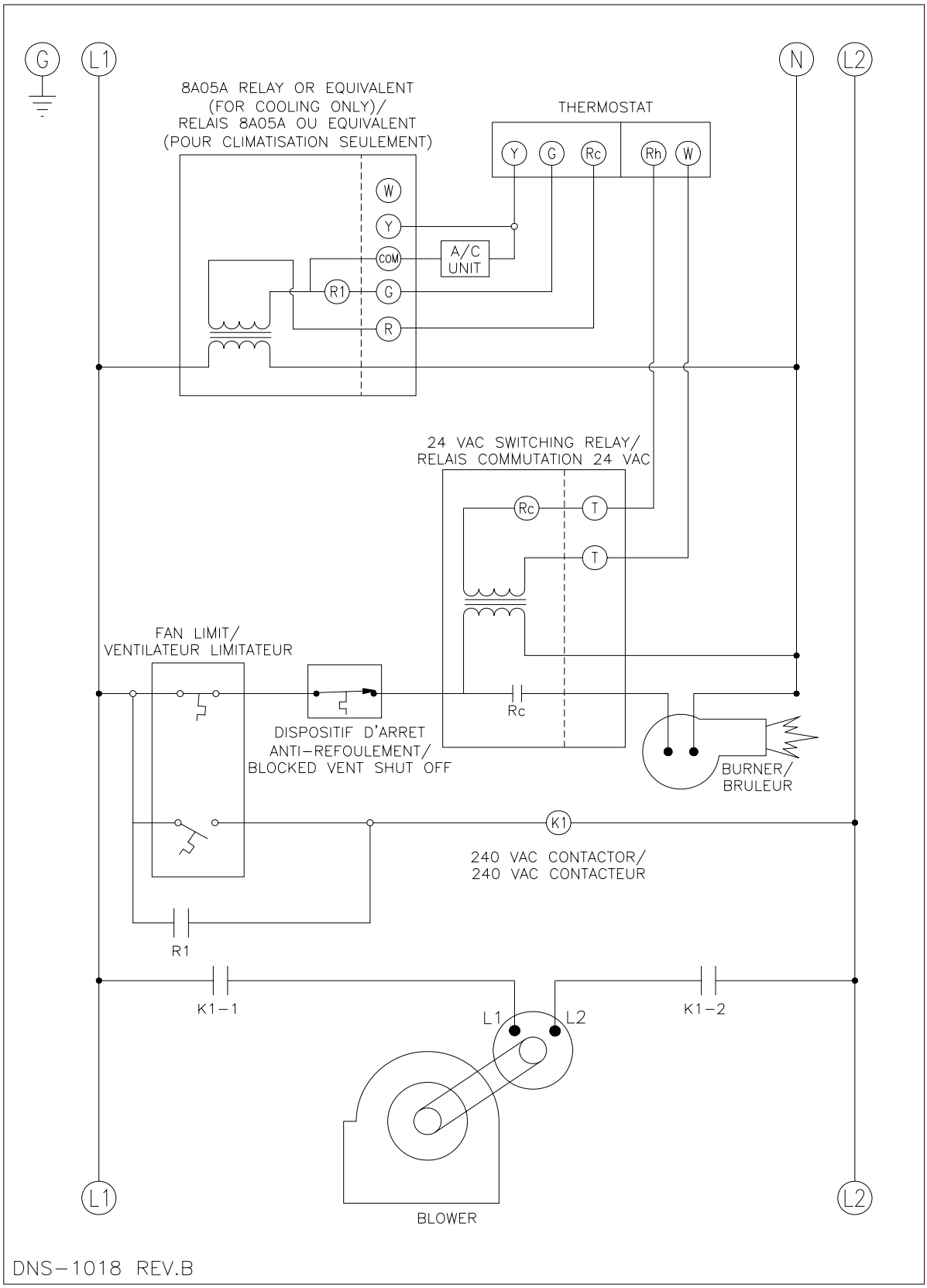

Figure 7 - Wiring Diagram, heating and cooling
AMT400B34-SM1PMA / OLR350H28B

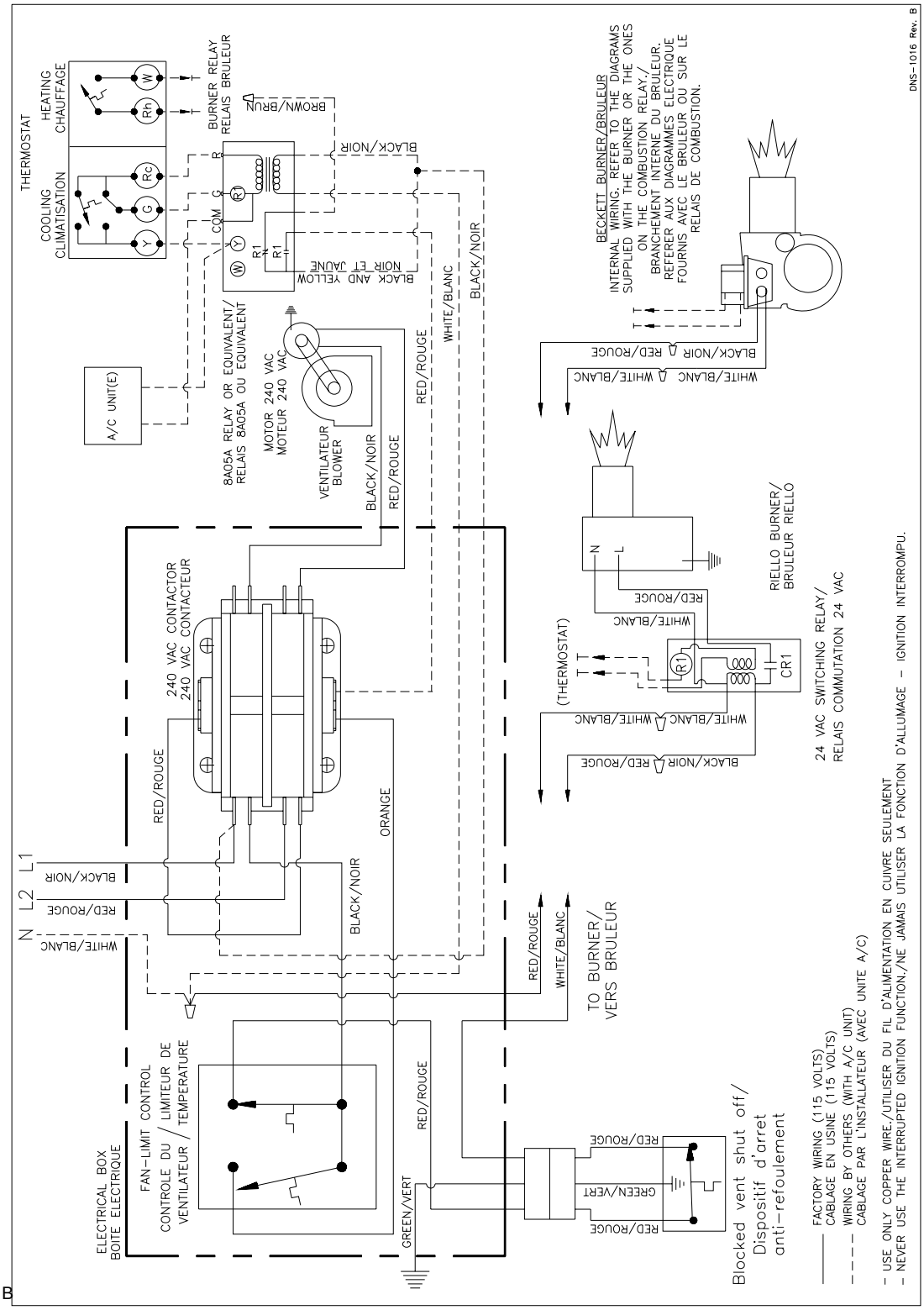

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Figure 8 - Wiring Diagram, Heating

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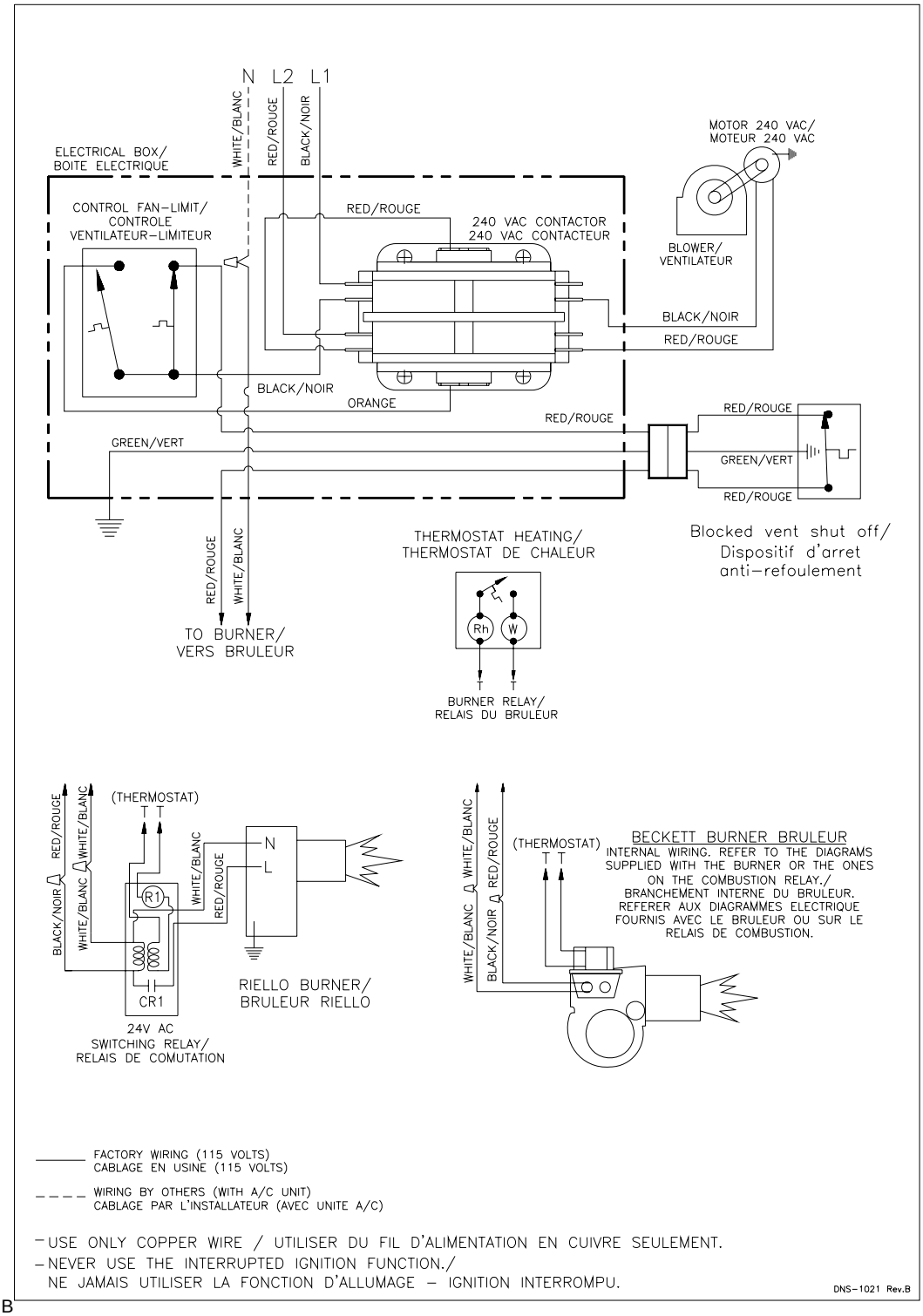

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Figure 9 - Parts List

With 4-speed motor PSC

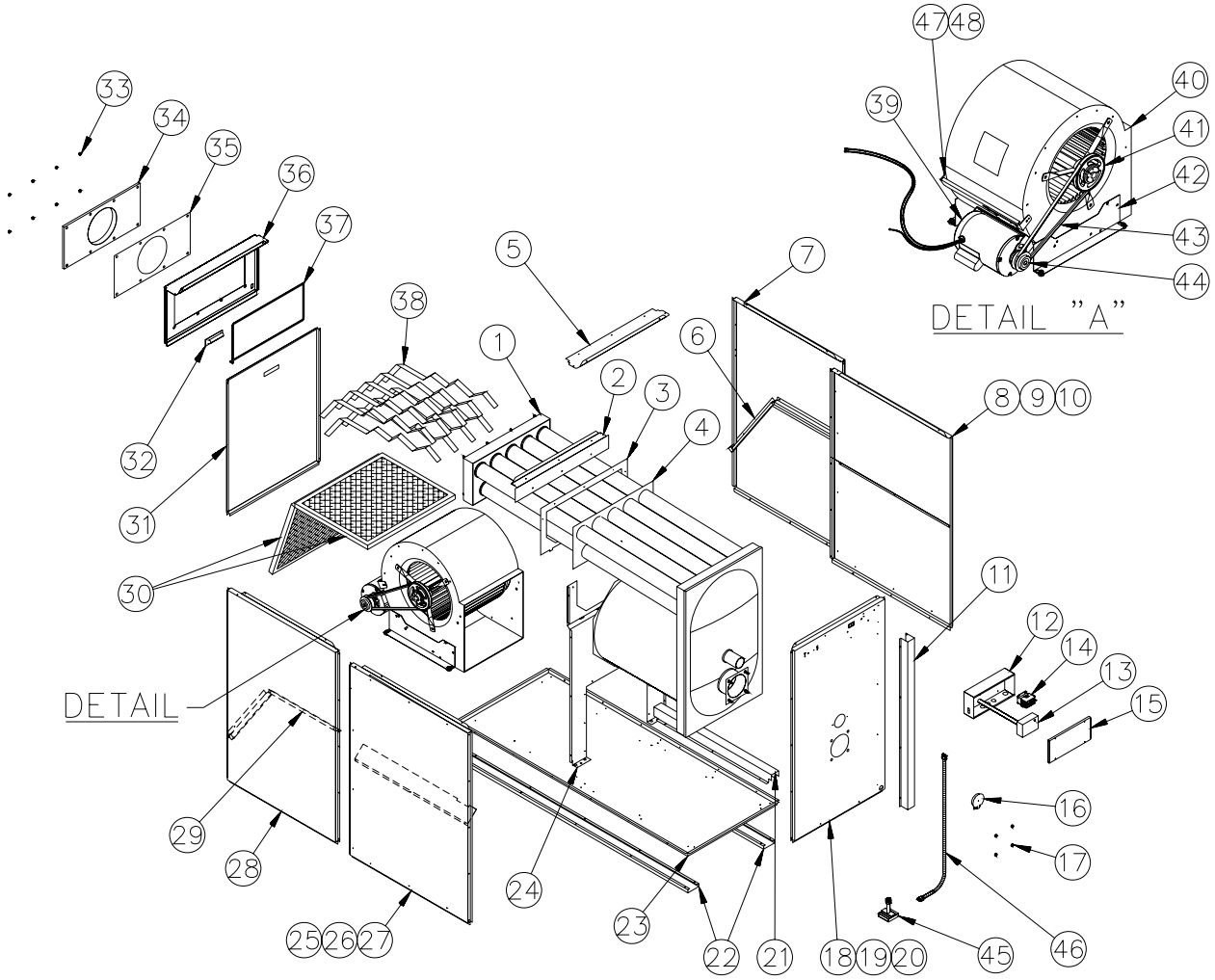

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Table 7 - Parts List

ITEM	PART #	DESCRIPTION
1	B02840	Heat exchanger
2	B02866	Top divider
3	B02838	Clamping plate
4	B02839	Top divider gasket
5	B02867	Front top divider 3"
6	B03344	Right filter support
7	B02853-05	Panel assembly, rear, side
8	B02877-01	Insulation, front panel
9	B02875-01	Baffle, right lateral
10	B02854-01	Panel assembly, front, side
11	B02858	Corner conduit
12	B03347	Electrical box
13	R02I001	Fan Limit 11 1/2"
14	L01H024	Contactor 240 VAC
15	B02782-05	Electrical box cover
16	B02111	Observation door assembly
17	F07F011	Hexagonal nut 3/8-16NC zinc
18	B02852-01	Front panel assembly
19	B02878	Front panel insulation
20	B01014	Gasket, observation door
21	B02872	Wire channel
22	B02871	Floor support
23	B02846	Floor assembly
24	B02850	Divider assembly
25	B02877-02	Front side panel insulation
26	B02875-02	Left lateral baffle
27	B02854-02	Front side panel assembly
28	B02853-02	Rear side panel assembly
29	B02870-02	Left filter support
30	Z04F014	Paper filter 20" x 24" x 1" (2 required)
31	B02847	Rear door assembly
32	Z99F050	Recessed handle, black
33	F07O001	Hexagonal nut 3/8-16NC brass
34	B02835	Flue box assembly 8"
35	B02714	Gasket, smoke box
36	B03345	Rear top panel
37	B00702-13	Extruded joint
38	B00711	Baffle (9 required)
39	L06L002	Motor 1.5 HP
40	Z01F019	Blower G15-12BD
41A	Z02I004	Blower pulley 5.5" OD
41B	Z02I005	Bushing 1"
42A	B02874-01	Blower leg, right
42B	B02874-02	Blower leg, left
43	Z03F010	V-belt 48.2"
44A	Z02H002	Motor pulley 3.15" OD, adjustable
44B	Z02I005	Motor pulley bushing
45	B03118-01	Electrical kit for BVSO
46	Z06G001	Blocked vent shut off BVSO
47	Z01F022	Motor adjustement kit (2 required)
48	Z01F023	Motor track support